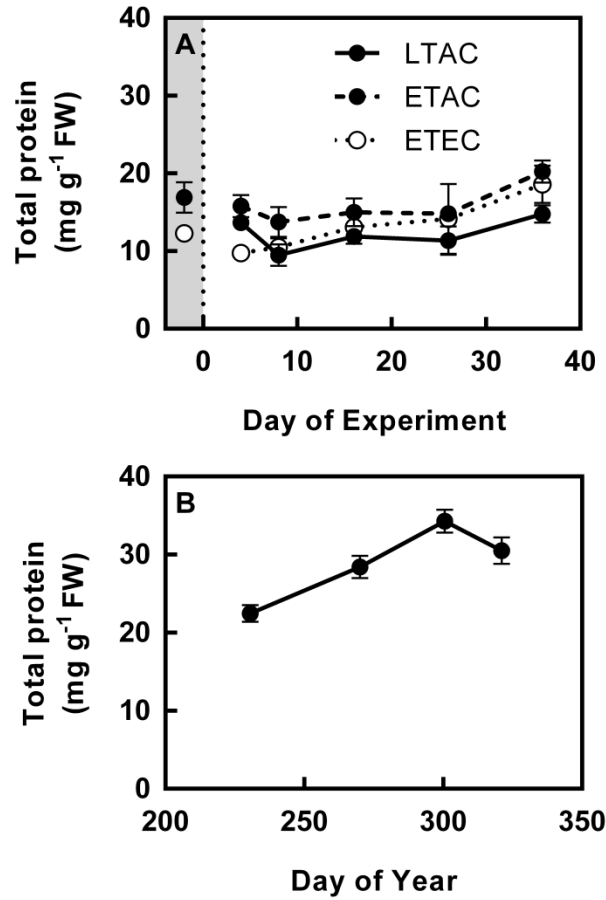


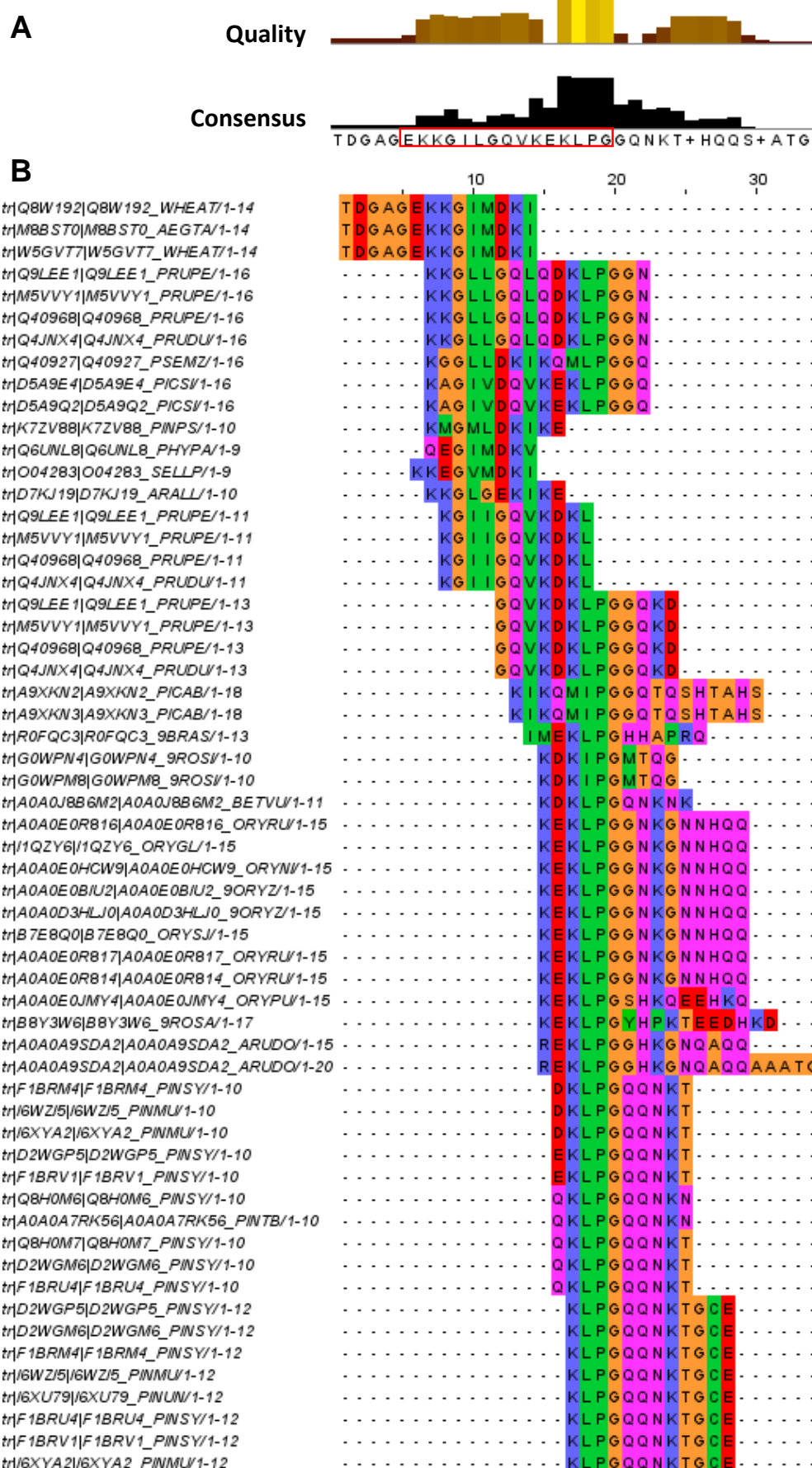
**Table S1. The effects of treatment and time on photosynthetic gas exchange, chlorophyll fluorescence, photosynthetic pigments, and carbohydrates.**

Two-way ANOVA was calculated using the formula: Variable ~ Treatment \* Time + (1|Trial) + (1|Indiv). Treatment and time were included as categorical fixed factors; experimental replicate (Trial) and individual seedling (Indiv) were included as random factors. *P*-values in bold indicate statistical significance ( $\alpha = 0.05$ ).

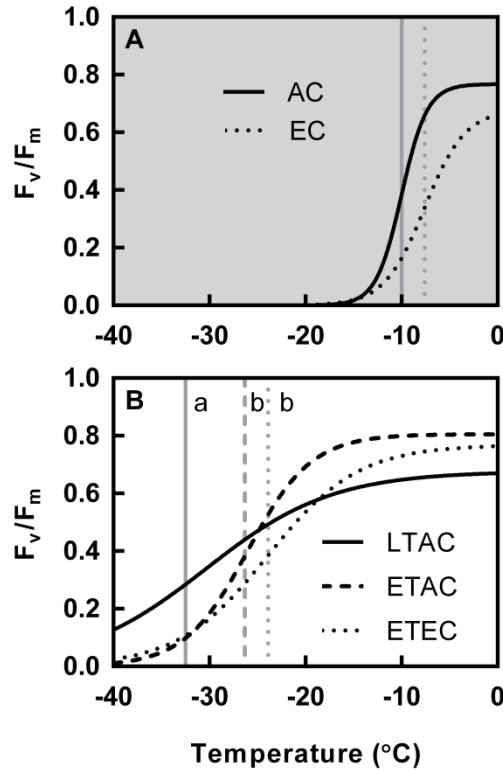
Category	Parameter	<u>Treatment</u>		<u>Time</u>		<u>Treat × Time</u>	
		<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>
Photosynthetic gas exchange	A <sub>net</sub>	<b>84.040</b>	<b>&lt;0.001</b>	<b>4.260</b>	<b>&lt;0.001</b>	<b>2.950</b>	<b>&lt;0.001</b>
	g <sub>s</sub>	<b>9.859</b>	<b>&lt;0.001</b>	0.478	0.824	1.244	0.226
	R <sub>d</sub>	<b>5.083</b>	<b>0.007</b>	<b>9.301</b>	<b>&lt;0.001</b>	1.488	0.132
	E	<b>42.610</b>	<b>&lt;0.001</b>	1.239	0.288	<b>2.559</b>	<b>0.004</b>
	IWUE	<b>46.904</b>	<b>&lt;0.001</b>	0.858	0.527	1.563	0.105
Chlorophyll fluorescence	F <sub>v</sub> /F <sub>m</sub>	<b>141.680</b>	<b>&lt;0.001</b>	<b>18.854</b>	<b>&lt;0.001</b>	<b>11.304</b>	<b>&lt;0.001</b>
	Φ <sub>PSII</sub>	<b>98.580</b>	<b>&lt;0.001</b>	<b>2.862</b>	<b>0.011</b>	<b>10.637</b>	<b>&lt;0.001</b>
	NPQ	<b>12.849</b>	<b>&lt;0.001</b>	<b>5.952</b>	<b>&lt;0.001</b>	<b>2.292</b>	<b>0.009</b>
	NPQ <sub>s</sub>	<b>144.522</b>	<b>&lt;0.001</b>	<b>14.471</b>	<b>&lt;0.001</b>	<b>8.739</b>	<b>&lt;0.001</b>
	1-qP	<b>71.844</b>	<b>&lt;0.001</b>	<b>4.549</b>	<b>&lt;0.001</b>	<b>7.079</b>	<b>&lt;0.001</b>
Photosynthetic pigments	Total Chl	<b>9.795</b>	<b>&lt;0.001</b>	<b>11.504</b>	<b>&lt;0.001</b>	<b>3.160</b>	<b>&lt;0.001</b>
	Car/Chl	<b>12.940</b>	<b>&lt;0.001</b>	<b>4.758</b>	<b>&lt;0.001</b>	1.467	0.139
	Chl a/b	<b>7.917</b>	<b>&lt;0.001</b>	0.941	0.467	<b>3.200</b>	<b>&lt;0.001</b>
	V+A+Z/Chl	<b>34.125</b>	<b>&lt;0.001</b>	<b>4.127</b>	<b>&lt;0.001</b>	<b>2.314</b>	<b>0.009</b>
	DEPS	<b>61.462</b>	<b>&lt;0.001</b>	<b>21.187</b>	<b>&lt;0.001</b>	<b>11.718</b>	<b>&lt;0.001</b>
Carbohydrates	Starch	<b>9.397</b>	<b>&lt;0.001</b>	<b>46.018</b>	<b>&lt;0.001</b>	<b>3.788</b>	<b>&lt;0.001</b>
	Soluble	2.916	0.057	<b>23.846</b>	<b>&lt;0.001</b>	1.139	0.333
	Sucrose	<b>3.867</b>	<b>0.023</b>	<b>9.767</b>	<b>&lt;0.001</b>	1.422	0.158
	Hexose	<b>39.158</b>	<b>&lt;0.001</b>	<b>3.619</b>	<b>0.002</b>	<b>5.176</b>	<b>&lt;0.001</b>
	Pinitol	2.116	0.123	<b>14.114</b>	<b>&lt;0.001</b>	1.533	0.115
	Raffinose	<b>9.033</b>	<b>&lt;0.001</b>	<b>5.417</b>	<b>&lt;0.001</b>	<b>3.958</b>	<b>&lt;0.001</b>



**Figure S1.** Changes in total leaf protein content A) under controlled conditions in growth chambers in response to low temperature/ambient CO<sub>2</sub> (LTAC), elevated temperature/ambient CO<sub>2</sub> (ETAC), and elevated temperature/elevated CO<sub>2</sub> (ETEC) treatments; and B) over autumn under field conditions. Grey background indicates long photoperiod controls; white background indicates short photoperiod treatments. Bars represent the average of A)  $n = 8-10 \pm SE$  biological replicates.



**Figure S2.** A) Predicted sequence of K-segment of the 16-kD dehydrin and B) alignment of peptides used to generate consensus. Consensus K-segment is outlined in red. Accession numbers for homologous proteins matched to each peptide are shown. Amino acids are color coded according to their chemical properties using the Lesk color scheme.



**Figure S3.** Response of shoot freezing tolerance to A) CO<sub>2</sub> level in seedlings grown under long photoperiod; B) low temperature/ambient CO<sub>2</sub> (LTAC), elevated temperature/ambient CO<sub>2</sub> (ETAC), and elevated temperature/elevated CO<sub>2</sub> (ETEC) in seedlings grown under short photoperiod. Grey background indicates long photoperiod controls; white background indicates short photoperiod treatments after 36 days. Grey vertical lines indicate midpoints representing LT<sub>50</sub>. Letters, where present, indicate statistically different groups as determined by extra sum-of-squares F test.